operation surface. The transparent resin film **4** is made of PET (polyethylene terephthalate) or PC (polycarbonate), for example. The transparent resin film **4** is bonded to the outer peripheries of the transducers **3**, which are formed around the SAW touch panel operation area, with double-faced adhesive tape **5** of a predetermined thickness.

[**0036**] A large number of dot spacers **6** are formed in a matrix fashion on the substrate-facing surface of the transparent resin film **4** by a printing process. Even if the film has flexing due to a change in the environment, only the dot spacers **6** are brought into contact with the glass substrate **2**. Accordingly, when touch input is not carried out, the transparent resin film **4** can be prevented from touching the surface of the glass substrate **2**.

[**0037**] Each of the dot spacers **6** is very small, having a diameter of approximately 10 μm. Also, each of the dot spacers **6** has a hemispherical shape. Even if the dot spacers **6** touch the glass substrate **2**, the contact area is so small that the SAW being propagated on the surface of the glass substrate **2** is not interrupted.

[**0038**] When touch input is carried out on the touch panel **100**, the transparent resin film **4** is bent so greatly as to touch the SAW propagation surface of the glass substrate **2** to interrupt the SAWs. Accordingly, the touched location can be detected. The transparent resin film **4**, which is the outer surface of the touch panel **100**, increases the shock resistance of the touch panel **100**. Even if the glass substrate **2** is broken by great impact, the transparent resin film **4** on the surface prevents fragments of glass from scattering.

[**0039**] In a case where the transparent resin film **4** is made of PET, and the glass substrate **2** as a SAW touch panel and the transparent resin film **4** are not subjected to surface treatment, the light transmittance is approximately 86%, which is higher than the light transmittance (80%) of a conventional touch panel with a resistive film. Also, the touch panel **100** of this embodiment does not need an ITO film that is essential for the conventional touch panel with a resistive film. Accordingly, the touch panel **100** is not colored, and the problem with the conventional resistive-film touch panel can be eliminated so that the color of the display screen is not changed.

[**0040**] In this embodiment, an antireflection film may be formed on either surface of each of the transparent resin film **4** and the glass substrate **2**, so that the light transmittance can be increased to approximately **95**%. By doing so, the shock resistance can also be increased, without reducing the brightness of the display screen. The antireflection film may be formed on only one surface of each of the transparent resin film **4** and the glass substrate **2**.

[**0041**] So as to further increase the operability of the touch panel **100** in accordance with the first embodiment, the transparent resin film **4** is made of a material that can easily absorb SAW, such as cycloolefin, and the dot spacers **6** are made of a material that does not easily absorb SAWs, such as acryl. With this structure, input cannot easily be carried out when an object other than the film member touches the glass substrate **2**. Thus, the detecting accuracy is increased.

[**0042**] As described above, in the touch panel **100** in accordance with the first embodiment, the transparent resin film **4** is placed over the glass substrate **2**, with the predetermined space layer being interposed in between. The dot spacers **6** are formed on the substrate-facing surface of the transparent resin film **4**. Accordingly, SAWs being propagated on the glass substrate **2** are not absorbed by the dot spacers **6**. When the transparent resin film **4** is bent to touch the glass substrate **2** through a touch of a pen or a finger, the SAWs are absorbed. In this manner, there is only a small propagation loss of surface acoustic wave being propagated on the glass substrate **2**, and accurate location detection can be performed.

[**0043**] Thus, a touch panel that have excellent visibility and shock resistance can be realized, without a change of color of a display screen such as a LCD.

Second Embodiment

[**0044**] **FIG. 4** is a section view of a touch panel in accordance with a second embodiment. **FIG. 5** is a plan view of the touch panel in accordance with the second embodiment that has second protrusions **202**. In **FIGS. 4 and 5**, the same components as those of the first embodiment are denoted by the same reference numerals as the corresponding ones of the first embodiment, and explanation of them will be omitted in the following description.

[**0045**] In the touch panel **200** in accordance with the second embodiment, the second protrusions **202** are formed in the inner peripheral regions on the substrate-facing surface of the transparent resin film **4**. The inner peripheral regions are not to touch the transducers **3**. The second protrusions **202** are situated closer to the glass substrate **2** than the dot spacers **6** to the glass substrate **2**. The second protrusions **202** are also dot spacers that are arranged to form dike-like mounds, as shown in **FIG. 5**. The second protrusions **202**, as well as the dot spacers **6**, may be formed through a printing process.

[**0046**] In the touch panel **200** in accordance with the second embodiment, dike protrusions **201** are further formed in the outer peripheral regions on the substrate-facing surface of the transparent resin film **4** of the first embodiment. The outer peripheral regions are not to touch the transducers **3**. The dike protrusions **201** represent third protrusions.

[**0047**] As shown in **FIG. 4**, the touch panel **200** in accordance with the second embodiment has a double-dike structure, having the dike protrusions **201** in the outer peripheral regions that are not to touch the transducers **3**, and the second protrusions **202** in the inner peripheral regions that are not to touch the transducers **3** either. The dike protrusions **201** are secured to the glass substrate **2** with double-faced adhesive tape **203**. The double-faced adhesive tape **203** is preferably made of an adhesive material having a sound absorbing effect. The double-faced adhesive tape **203** represents a bonding means. The bonding may be performed with an adhesive agent, instead of the double-faced adhesive tape **203**.

[**0048**] Conventionally, a sound absorbing pattern is formed in the outer peripheral regions of the glass substrate **2**, so as to prevent the SAWs from being reflected from the end faces. However, it is possible to omit the sound absorbing pattern in the second embodiment, because the adhesive material of the double-faced adhesive tape **203** has a sound absorbing effect. Thus, surface acoustic wave can be prevented from being reflected from the end faces. Also, the double-faced adhesive tape **203** shields the touch panel **200**